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NASA STI PROGRAM
Coordinating Council
Tenth Meeting

April 22, 1993

Information Retrieval: The Role of Controlled Vocabularies (Summary of Proceedings)

National Aeronautics and
Space Administration

Scientific and Technical
Information Program

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COORDINATING COUNCIL MEETING

INFORMATION RETRIEVAL: THE ROLE OF CONTROLLED VOCABULARIES

April 22, 1993
10:00 am - 4:30 pm
Crystal City Gateway 4
Conference Room

Attendees

NASA/Code JTT
Katie Bajis
Barbara Bauldock
Bonnie Carroll
Beth Duston
Jim Erwin
Janice Freeman
Jennifer Garland
Laurie Harrison
Linda Hill
Glenn Hoetker
Karen Holloway
Tom Lahr
Harry Needleman
Kriston Ostergaard
Roland Ridgeway
Lou Ann Scanlan
Ron Sepic
Debbie Stubberfield
Patt Sullivan
Ardeth Taber
Kay Voglewede
John Wilson

NASA/CASI
Carl Eberline
Ron Buchan
Bob Ferris
Wanda Colquitt
Joe Gignac
Jim Schroer
June Silvester
Roy Stiltner

NASA/AIAA/TIS
Tom Cheung
Barbara Lawrence

NASA/GSFC
Paul Baker
Jane Riddle

DoD/DTIC
John Dickert
Marcia Hanna
Gretchen Schlag
Annie Washington
David Williford

DOE/OSTI
Mona Raridon

Batelle
Mason Soule

MITRE
Elaine Lusher
Inderjeet Mani

NLM/MEDLINE
Peri Schuyler

OTHER
Elliott Linder

Welcome

Jim Erwin
NASA STI Program

Overview

Dr. Linda Hill
NASA STI Program

Retrieval: Free Text, Full Text, and Controlled Vocabularies

Dr. Raya Fidel
Associate Professor
Graduate School of Library and Information Science
University of Washington

Thesaurus Standards and Practicalities

Dr. Bella Hass Weinberg
Professor
Division of Library and Information Science
St. John's University

Panel Discussion of Federal Thesauri

Moderator: John Wilson, NASA STI Program

Ron Buchan, NASA/CASI
Gretchen Schlag, DoD/DTIC
Mona Raridon, DOE/OSTI
Peri Schuyler, MEDLINE

NASA STI Program

Coordinating Council

The NASA Scientific and Technical Information (STI) Program Coordinating Council consists of participants from NASA Headquarters, NASA Centers, and NASA contractors. The Coordinating Council meets periodically to exchange information and pursue topics of vital interest to the NASA STI Program.

Coordinating Council Meetings

First Meeting	NASA RECON Database	May 23, 1990
Second Meeting	International Acquisition	July 23, 1990
Third Meeting	STI Strategic Plan	November 29, 1990
Fourth Meeting	NACA Documents Database Project	February 7, 1991
Fifth Meeting	Quality	July 1, 1991
Sixth Meeting	Who Are Our Key Users?	October 25, 1991
Seventh Meeting	Acquisitions	January 23, 1992
Eighth Meeting	Using the Internet	June 5, 1992
Ninth Meeting	Total Quality Management	October 28, 1992
Tenth Meeting	Information Retrieval: The Role of Controlled Vocabularies	April 22, 1993

Document Preparation

The following summary was prepared from the audio tape of the session by the staff at the NASA Center for AeroSpace Information (CASI) and reviewed by the speakers. The summary is intended to give the substance of the presentations and does not attempt to report on either the panel discussion or the comments from the audience.

Information Retrieval: The Role of Controlled Vocabularies

Introductions

Jim Erwin established one of the goals of today's conference as determining the ongoing role of controlled vocabulary in information retrieval. He anticipated that the meeting would help to clearly delineate where we were in the area of information retrieval and allow us to determine how we measure up against the state of the art.

Dr. Hill noted that one of the purposes of the conference was to establish a dialog among the participants on the complex topic of controlled vocabularies and their place as retrieval tools in a free text environment.

Retrieval; Free Text, Full Text, and Controlled Vocabularies. Dr. Raya Fidel

To illustrate the difficulties that can result from a lack of a controlled vocabulary, Dr. Fidel discussed a search for the subject of exposures to substances or conditions that are a risk to health by using the phrase "exposure assessment methodology" (see viewgraphs 1 and 2). The aim of the search was to find information about measurement techniques. The difficulty is that each word in the phrase is so common that, if you ran a search using the words only, you would get a great many citations on a variety of subjects (see viewgraph 3). The ambiguity inherent in the individual words is matched by the ambiguity of the phrase itself. In order to insure broad recall of relevant records, the searcher needs to generate a set of synonyms for each concept. Synonyms include the words that people actually use in practice when they talk about a particular concept. Thus, an effective list of synonyms will include words sharing the same meaning as well as associated terms generated by the searcher out of her knowledge of real-life linguistic behavior.

Terms and concepts

This example of searching for the subject "exposure assessment methodology" illustrates the differences between free text (or even full text)

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searching and the use of controlled vocabularies (thesaurus terms). The searcher needed to find records that were relevant to the topic. In a free text environment without benefit of a controlled vocabulary, all that she had to search with were natural language terms from the documents or records. She did not have the benefit of controlled vocabulary where terminology for concepts had been standardized. She could not search with concepts. So, she made up the appropriate concepts for that particular search and tried to generate terms that matched those concepts to get at the information that she wanted. This approximates what is done when indexing with a controlled vocabulary. The indexer identifies concepts based on a reading of the material and then chooses the appropriate words (descriptors) from the controlled vocabulary (the thesaurus) to represent those concepts (see viewgraph 4).

Need for controlled vocabularies

Why should we create these controlled vocabularies beforehand and use them in indexing? One of the great values of controlled vocabularies is that they make implicit concepts explicit through hierarchical relationships between terms. These relationships between broad terms and narrow terms cannot be derived from an analysis of free text. They must be intellectual constructs. We have terminological control and content analysis through indexing. We need a controlled vocabulary if we want to retrieve concepts that can be represented in various ways, or inferred, in free text.

Cost versus effectiveness

Are controlled vocabularies cost-effective? Free text advocates argue that they are not cost-effective. Some studies found that free text and controlled vocabulary searching have the same results. Other studies have found that one or the other of the

Information Retrieval: The Role of Controlled Vocabularies

methods were more effective. Most of the studies were flawed; the question has not been answered.

Retrieval effectiveness: Review of retrieval studies

A renewed interest in retrieval techniques and the differences among them resurfaced with the advent of full text searching. There were conflicting results from studies comparing full text searches with controlled vocabulary searches. A study (Tenopir, 1985) using the Harvard Business Review Online database, reported on a controlled experiment in which 31 requests were searched in four different formats: only the text, only the title, only the abstract, and only the descriptors. Results indicated that full text searches retrieved more than the other methods, yielding high recall, but with low precision. The controlled vocabulary performed better than free text if one didn't look at the full text, but only at the titles and abstracts. The conclusion of the study was that a combination of controlled vocabulary with a full text search technique gives the best results, since the controlled vocabulary compensates for the imprecision of the full text search.

Recall capability

In a study (McKinin et al., 1990), 100 questions generated by people that came into the library asking for literature searches were searched using two full text databases. Although the searches resulted in high recall, it was found that using the controlled vocabulary found some articles that were missed by the full text searches. Why were they missed? In 25% of the cases, it was because the concepts were not explicit in the text. In 33% of the cases, failure to capture a document was because the searchers did not use enough synonyms. Thus, in 58% of the cases, the failures could have been avoided by the use of a controlled vocabulary.

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Precision and recall

An earlier study (Blair & Maron, 1985) found that when you have a very large full text database, you get very poor retrieval using free text searching. In this study, using a 40,000 document database and 360,000 pages of text, legal paraprofessionals with search experience searched 51 questions. Results indicated high precision (79%), but low recall (20%), a counter-intuitive result. Low recall resulted, in part, from the drawbacks that are inherent in full text searching without a controlled vocabulary: the concepts that were being searched had different terms attached to them. Accidents, for example, were variously referred to as events, incidents, situations, problems, difficulties, etc.

When to use free text and/or controlled vocabularies

In the last study cited (Fidel, 1992), 47 searchers were observed as they performed their searches. They were asked to think aloud, reflecting on their reasons for making various decisions. Dr. Fidel also interviewed each searcher. It was found that the decision whether to use a free text search term or a controlled vocabulary search term depended on the specific situation. If the term was a common one, it was best to use descriptors. If the term was well-defined and recall was not important (the client simply wanted to get some articles), then free text was used.

Conclusion

The overall conclusion drawn from a review of these studies was that full text searching can by no means replace the use of a controlled vocabulary. The ideal search environment is one in which a controlled vocabulary complemented a free text search capability.

Thesaurus Standards and Practicalities
Dr. Bella Hass Weinberg

Dr. Weinberg analyzed the various structures of thesauri and their display in print and online, early making the point that there was not one standard or

Information Retrieval: The Role of Controlled Vocabularies

correct structure for thesauri. Chosen for comparison were four thesauri produced by government agencies that participated in the following panel discussion: the National Aeronautics and Space Administration (NASA), the National Library of Medicine (NLM), the Department of Defense (DoD), and the Department of Energy (DOE). The structures of the thesauri are varied and complex, a situation that contributes to a lack of utilization. Using viewgraphs to illustrate the hierarchical arrangement of terms, the thesauri were presented in order of increasing complexity of structure: the Defense Technical Information Center Thesaurus (see viewgraphs 5-9), the Department of Energy's International Energy Subject Thesaurus (see viewgraphs 10-13), the NASA Thesaurus (see viewgraphs 14-23), and the National Library of Medicine's Medical Subject Headings (MeSH) (see viewgraphs 24-31). Comparisons and contrasts were made among such thesaurus features as the structure of broader and narrower terms, the presence or absence of related terms, and levels of hierarchy.

Analysis of four thesauri

Specifically, Dr. Weinberg analyzed in some detail the following aspects of the four thesauri (see viewgraph 32) : the primary alphabetic sequence, the dictionary, the concordance of all words, and the classified display. Again, the overriding point was how confusing thesauri can be to users.

Alphabetic sequence

In the DOE thesaurus, the primary alphabetic sequence is called Subject Thesaurus; in DTIC it is called Posting Terms; in MeSH, Annotated Alphabetic List; and in the NASA Thesaurus, Hierarchical Listing.

Dictionary

Dictionary functions are also variously accomplished. In the DOE thesaurus, some definitions are within the alphabetic sequence, with a tag. In

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DTIC, there are some definitions, without a tag. MeSH includes some lexical information within scope notes. NASA carries the definitions in a separate volume.

Concordance

DOE has no concordance. DTIC calls its concordance Key Words Out of Context, and places it in Section 3. MeSH calls it Permuted Medical Subject Headings, while NASA calls it Access Vocabulary.

Classified display

DOE has no classified display. DTIC has a separate hierarchical listing. MeSH has a separate hierarchical display, one that consists of tree structures with no redundancy to the alphabetic display. NASA's thesaurus does not have a separate printed panorama of the classification of all its descriptors. However, it provides complete broader- and narrower-term relationships for each term within the alphabetical sequence, called the Hierarchical Listing.

Semantic relationships

Next, Dr. Weinberg discussed thesaurus notation for semantic relationships (see viewgraph 33). In abstract terms there are three categories of semantic relationships: equivalence, hierarchy, and association.

Online thesaurus display

In her discussion of online thesaurus display, Dr. Weinberg noted that, compared with print displays, online displays in the major vendor systems are poorer, offering less information to the user (see viewgraphs 34-45). For example, scope notes are truncated. The definition information is not yet available in the major online systems. She found that some people who are mounting thesauri at DIALOG do not understand thesaurus codes. Used and Used For are both truncated to U and used in both directions in certain databases (see viewgraph 39).

Conclusion

In conclusion, Dr. Weinberg noted the great variations in thesauri structures. She argued that

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greater uniformity would simplify consultation of thesauri. (She is not, however, advocating uniformity in vocabularies.) She also called for a common command language for information retrieval that would enhance end user employment of the controlled vocabulary that we put so much effort into building.

Panel discussion

In the lively panel discussion on developing federal thesauri, a number of important issues were covered: the uses of retrospective indexing, the question of whether the addition of more postings to controlled vocabularies constitutes an advantage or a disadvantage to searchers, the impact of machine-aided indexing, and efforts aimed at standardizing terminology. What the panelists agreed upon was the need for on-going consultations among the panel participants on standardizing their respective vocabularies whenever possible.

References

Blair, David C. & Maron, M. E. (1985). An evaluation of retrieval effectiveness for a full-text document-retrieval system. Communications of the ACM, 28(3): 289-299.

Fidel, Raya (1992). Who needs controlled vocabulary? Special Libraries, 83(1) : 1-9.

McKinin, Emma Jean et al. (1991). The Medline/Full-Text Research Project. Journal of the American Society for Information Science, 42(4) : 297-307.

Tenopir, Carol (1985). Full text database retrieval performance. Online Review, 9(2) : 149-164.

Viewgraphs

Retrieval: Free Text, Full Text, and Controlled Vocabularies

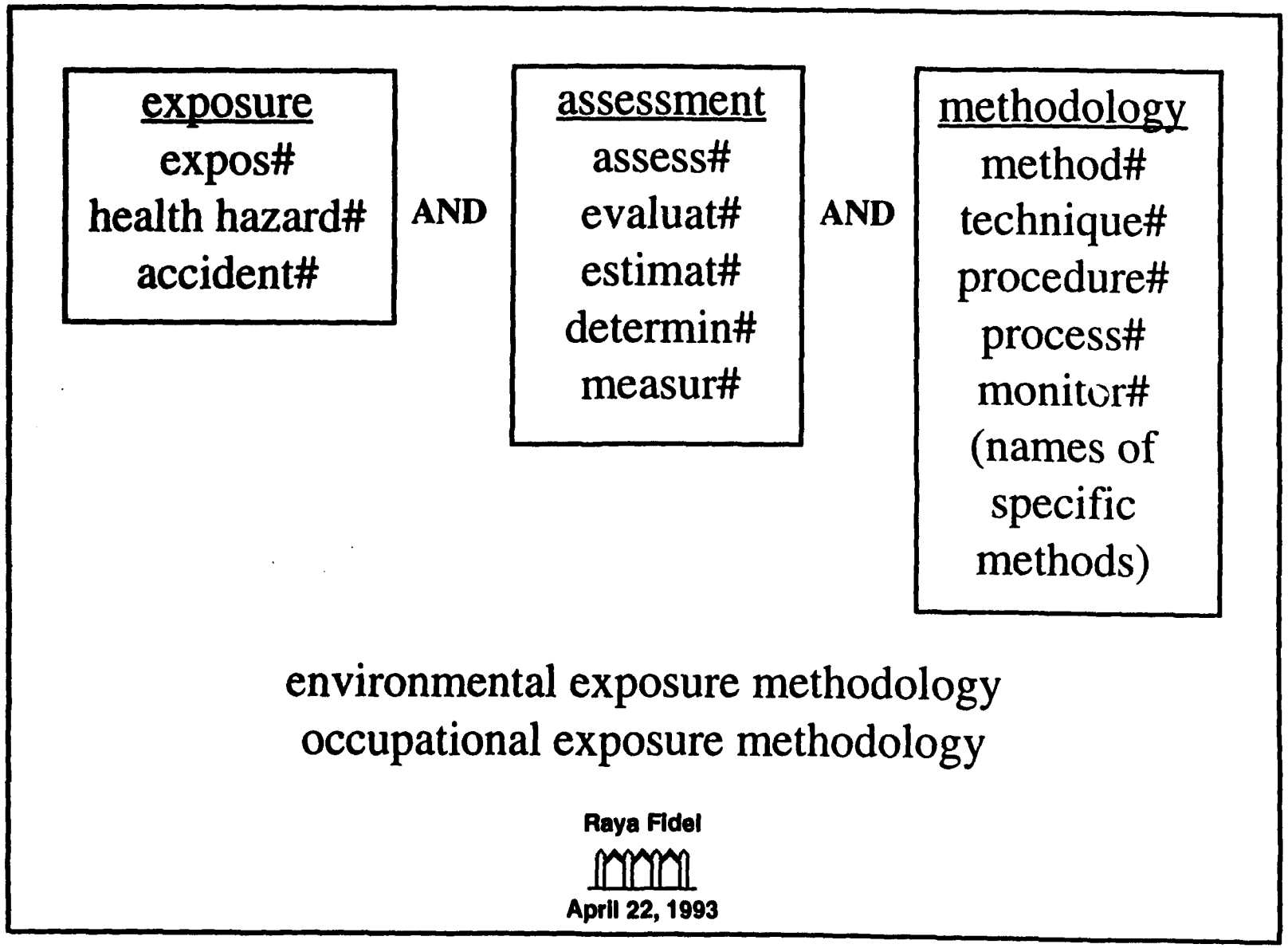
Dr. Raya Fidel

Exposure Assessment Methodology

Exposure AND Assessment AND Methodology

Raya Fidel

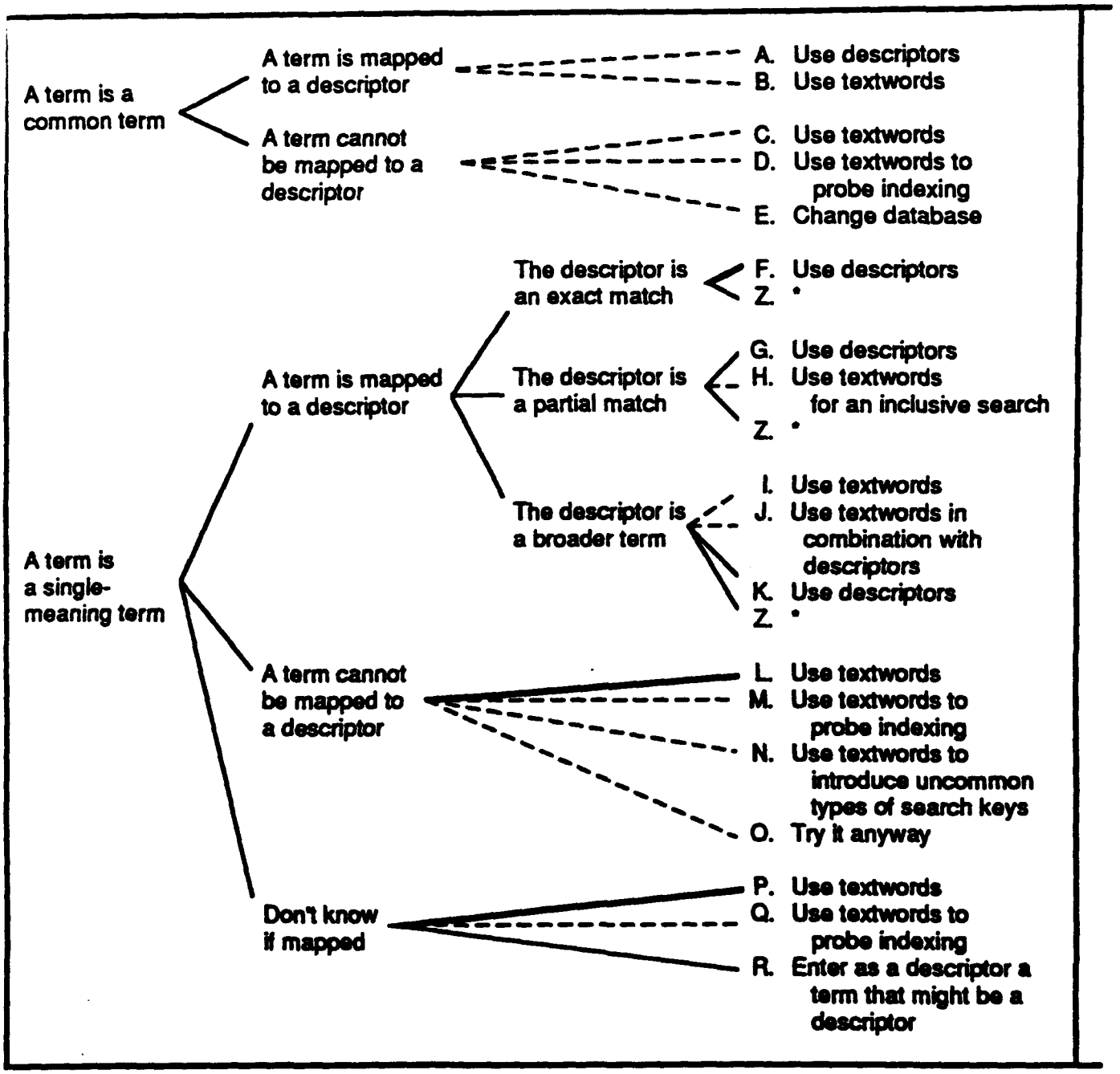
April 22, 1993


exposure
expos#
health hazard#
accident#
AND
assessment
assess#
evaluat#
estimat#
determin#
measur#
AND
methodology
method#
technique#
procedure#
process#
monitor#
(names of specific methods)
environmental exposure methodology
occupational exposure methodology
Raya Fidel
April 22, 1993

- A term has many meanings
- A term is ambiguous
- A term is vague
- A term occurs too frequently in the database's text

Raya Fidel

April 22, 1993


A term is a common term
A term is mapped to a descriptor
A term cannot be mapped to a descriptor
A. Use descriptors
B. Use textwords
C. Use textwords
D. Use textwords to probe indexing
E. Change database
A term is a single-meaning term
A term is mapped to a descriptor
The descriptor is an exact match
F. Use descriptors
Z. •
The descriptor is a partial match
G. Use descriptors
H. Use textwords for an inclusive search
Z. •
The descriptor is a broader term
I. Use textwords
J. Use textwords in combination with descriptors
K. Use descriptors
Z. •
A term cannot be mapped to a descriptor
L. Use textwords
M. Use textwords to probe indexing
N. Use textwords to introduce uncommon types of search keys
O. Try it anyway
Don't know if mapped
P. Use textwords
Q. Use textwords to probe indexing
R. Enter as a descriptor a term that might be a descriptor

Viewgraphs

Thesaurus Standards and Practicalities

Dr Bella Hass Weinberg

Viewgraphs 5 through 31 are pages from the DoD, DOE, NASA, and NLM thesauri.

Viewgraphs 32 and 33 are charts comparing the structures of the four thesauri.

Viewgraphs 32 through 45 are illustrations of DIALOG'S online thesaurus.

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Defense Technical Information Center

Thesaurus

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POSTING TERM ENTRY EXPLANATION

a. ARMY

b. (Scope note if necessary)

c. UF Army department

d. UFC Army medicine

e. BT *MILITARY FORCES (UNITED STATES)

f. NT FIELD ARMY

g. Army department
use ARMY

Army medicine
use ARMY
and MILITARY MEDICINE

a. Posting Term - A main entry appearing in boldface type which represents a significant class of concepts used for indexing and retrieval.

b. Scope Note - Exists when necessary to further define or limit the meaning or usage of a posting term.
NOTE: A date immediately preceding a scope note denotes the year and month the term was established as an authorized DTIC posting term.

c. Used For (UF) - The posting term at the main entry is to be used for any term following this notation. Reciprocates with use reference.

d. Used For Combination (UFC) - The posting term at the main entry together with one or more other posting terms are to be used for any term following this notation. Reciprocates with multiple use reference.

e. Broader Term (BT) - Posting terms following this notation represent a broader class which includes the main entry posting term.
NOTE: An (*) symbol in front of a BT indicates the existence of broader generic levels of terms.

f. Narrower Term (NT) - Posting terms following this notation are within the class of concepts represented by the main entry posting term.
NOTE: An (*) symbol in front of a NT indicates the existence of narrower generic levels of terms.

g. Use Reference - Refers the user to one or more preferred main entry posting terms. Always reciprocates with UF and UFC references.

ENVIRONMENTAL ENGINEERING
BT ENGINEERING

ENVIRONMENTAL IMPACT
(81/09) - Predetermination of the extent of pollution or environmental degradation.

ENVIRONMENTAL IMPACT STATEMENTS

ENVIRONMENTAL MANAGEMENT
BT MANAGEMENT

ENVIRONMENTAL PROTECTION
BT PROTECTION

ENVIRONMENTAL PSYCHOLOGISTS
BT PERSONNEL

ENVIRONMENTAL TESTS
BT *TEST METHODS
NT COLD WEATHER TESTS
DESERT TESTS
LIQUID IMMERSION TESTS
SALT SPRAY TESTS
SEA TESTING
TROPICAL TESTS

ENVIRONMENTS
NT *AEROSPACE ENVIRONMENTS
CONFINED ENVIRONMENTS
ELECTROMAGNETIC ENVIRONMENTS
INDUCED ENVIRONMENTS
LUNAR ENVIRONMENTS
*OCEAN ENVIRONMENTS

ENZOOTIC
(83/05) - A disease affecting animals in limited geographic regions.
BT DISEASES

ENZYME ANTAGONISTS
use ANTIMETABOLITES

ENZYME CHEMISTRY
BT *BIOCHEMISTRY

ENZYME INHIBITORS
BT INHIBITORS
NT *CHOLINESTERASE INHIBITORS
SERINE

ENZYME PRECURSORS
UF CHYMOSINOGEN
PEPSINOGEN
PLASMINOGEN
PREENZYMES
PROENZYMES
PROFIBRINOLYSIN
PRORENNIN
TRYPSINOGEN
NT *ENZYMES
PROTHROMBIN

ENZYMES
BT ENZYME PRECURSORS
NT ADENYL CYCLASE
*COENZYMES
COLLAGENASE
*DEHYDROGENASES
DEXTRANSUCRASE
GLUCANASES
*HYDROLASES
*ISOMERASES
*ISOZYMES
KETOACID LYASES
LUCIFERASE
*LYASES
MUCOLYTIC ENZYMES
NUCLEASE
*OXIDOREDUCTASES
PEPSINS
SACCHARIDASES
*TRANSFERASES

EOSINOPHILS
BT *LEUKOCYTES

EPHEMERIDES
UF EPHEMERIS

EPHEMERIS
use EPHEMERIDES

EPICENTERS
BT GEOGRAPHIC AREAS

EPIDEMIOLOGY
BT *MEDICINE

EPIDERMIS
(83/05) - The superficial portion of the skin, composed of a horny layer (stratum corneum) and a living, cellular part in layers named from outside inward: The stratum lucidum (when present), the stratum granulosum, the stratum spinosum, and the stratum germinativum. Skin is composed of dermis and epidermis.
BT *SKIN(ANATOMY)

EPILEPSY
BT *CONVULSIVE DISORDERS

EPIMERASES
use RACEMASES AND EPIMERASES

EPINEPHRINE
BT *CATECHOLAMINES
NT NOREPINEPHRINE

EPITAXIAL GROWTH
BT *CRYSTAL GROWTH

EPITHELIUM
BT TISSUES(BIOLOGY)

EPIZOOTIC
(83/05) - Affecting many animals of one kind in one region simultaneously; widely diffused and rapidly spreading.
BT DISEASES

EPOXIDATION
BT *OXIDATION

EPOXY COATINGS
BT COATINGS

EPOXY COMPOSITES
(81/09) - Composite materials or structures in which the binding material is epoxy compound, reinforced with various kinds of fibers, cast, layed-up or molded in various shapes.
BT *COMPOSITE MATERIALS
NT GRAPHITE EPOXY COMPOSITES

EPOXY COMPOUNDS
BT *OXYGEN HETEROCYCLIC COMPOUNDS
NT OXETANES

EPOXY LAMINATES
BT *LAMINATES

EPOXY RESINS
BT *THERMOSETTING PLASTICS

EQUALIZATION

EQUATIONS
UF SECULAR EQUATIONS
BT MATHEMATICS
NT BOLTZMANN EQUATION
*DIFFERENTIAL EQUATIONS
*EQUATIONS OF MOTION
EQUATIONS OF STATE
HUGONIOT EQUATIONS
*INTEGRAL EQUATIONS
LANCHESTER EQUATIONS
LIOUVILLE EQUATION
MAXWELLS EQUATIONS
SIMULTANEOUS EQUATIONS

EQUATIONS OF MOTION
UF MOTION EQUATIONS
BT *EQUATIONS
NT NAVIER STOKES EQUATIONS

EQUATIONS OF STATE
UF STATE EQUATIONS
BT *EQUATIONS

EQUATORIAL ORBITS
BT *ORBITS

EQUATORIAL REGIONS
BT *TROPICAL REGIONS

EQUILIBRATORS
use STABILIZATION SYSTEMS

EQUILIBRIUM(GENERAL)
NT EQUILIBRIUM(PHYSIOLOGY)

EQUILIBRIUM(PHYSIOLOGY)
BT EQUILIBRIUM(GENERAL)
PHYSIOLOGY

EQUINE ENCEPHALOMYELITIS VIRUS
UF BORNA DIASEASE
BT *GROUP A ARBOVIRUSES
NT EASTERN EQUINE ENCEPHALOMYELITIS VIRUS
VENEZUELAN EQUINE ENCEPHALOMYELITIS VIRUS
WESTERN EQUINE ENCEPHALOMYELITIS VIRUS

EQUINES
UF BURROS
DONKEYS
BT *MAMMALS
NT HORSES

EQUIVALENT CIRCUITS
BT *CIRCUITS

ERASURE

ERBIUM
BT *RARE EARTH ELEMENTS

(3)TURBOJET INLET SCREENS
(2)ENGINE CYLINDERS
(2)ENGINE FUEL SYSTEMS COMPONENTS
(3)CARBURETORS
(4)AIRCRAFT CARBURETORS
(2)ENGINE MUFFLERS
(2)ENGINE STARTERS
(2)FLYWHEELS
(2)IGNITION CIRCUITS
(2)PISTON RINGS
(2)PISTONS
(1)GAS GENERATOR ENGINES
(1)GAS TURBINES
(1)HEAT ENGINES
(2)EXTERNAL COMBUSTION ENGINES
(3)STEAM ENGINES
(1)INTERNAL COMBUSTION ENGINES
(2)COMPOUND ENGINES
(2)COMPRESSION IGNITION ENGINES
(3)DIESEL ENGINES
(2)ROTARY COMBUSTION ENGINES
(2)SPARK IGNITION ENGINES
(1)JET ENGINES
(2)HYDROJET ENGINES
(3)HYDRODUCT ENGINES
(3)HYDROPULSE ENGINES
(3)HYDROTURBOJET ENGINES
(2)PULSEJET ENGINES
(3)HYDROPULSE ENGINES
(2)RAMJET ENGINES
(3)HYDRODUCT ENGINES
(3)RECOMBINATION RAMJET ENGINES
(3)ROCKET RAMJETS
(4)INTEGRAL ROCKET RAMJETS
(3)SUPERCHARGED EJECTOR RAMJET ENGINES
(3)SUPERSONIC COMBUSTION RAMJET ENGINES
(3)TURBORAMJET ENGINES
(3)WING RAMJET ENGINES
(2)TURBOJET ENGINES
(3)HYDROTURBOJET ENGINES
(3)TURBOFAN ENGINES
(4)HIGH BYPASS TURBOFANS
(4)LOW BYPASS TURBOFANS
(4)VARIABLE BYPASS TURBOFANS
(3)TURBOPROP ENGINES
(3)TURBORAMJET ENGINES
(3)TURBOSHAFT ENGINES
(3)VARIABLE CYCLE ENGINES
(1)MARINE ENGINES
(2)SUBMARINE ENGINES
(1)MULTIFUEL ENGINES
(1)MULTIPULSE ENGINES
(1)PISTON ENGINES
(2)RECIPROCATING ENGINES
(3)DIESEL ENGINES
(3)STEAM ENGINES
(1)ROCKET ENGINES
(2)ARC JET ENGINES
(2)BOOSTER ROCKET ENGINES
(3)RECOVERABLE BOOSTER ENGINES
(2)CONTROLLABLE THRUST ROCKET ENGINES
(2)DUCTED ROCKETS
(2)ENGINE CLUSTERS
(2)FOURTH STAGE ENGINES
(2)HYBRID ROCKET ENGINES
(2)ION ENGINES
(2)LIQUID PROPELLANT ROCKET ENGINES
(3)CRYOGENIC ENGINES
(2)MOVABLE ROCKET ENGINES
(2)NOZZLELESS ROCKET ENGINES
(2)PLASMA ENGINES
(2)RESISTORJET ENGINES
(2)RETRO ROCKETS
(2)ROCKET RAMJETS
(3)INTEGRAL ROCKET RAMJETS
(2)SECOND STAGE ENGINES
(2)SOLAR ROCKETS
(2)SOLID PROPELLANT ROCKET ENGINES
(3)DUAL THRUST ROCKET ENGINES
(3)JATOS
(3)SEGMENTED ROCKET ENGINES
(2)SUSTAINER ENGINES
(2)THIRD STAGE ENGINES
(2)THIXOTROPIC PROPELLANT ROCKET ENGINES
(2)THRUSTERS
(2)VERNIER ROCKET ENGINES
(1)TANK ENGINES
(1)TRACTOR ENGINES
(1)VARIABLE CYCLE ENGINES

ENGRAVING
(1)PHOTOENGRAVING

ENRICHMENT
(1)REACTOR FUEL ENRICHMENT

ENTRAINMENT
(1)AIR ENTRAINMENT

ENVIRONMENTS
(1)AEROSPACE ENVIRONMENTS
(2)SPACE ENVIRONMENTS
(3)DEEP SPACE
(3)INTERPLANETARY SPACE
(3)INTERSTELLAR SPACE
(3)OUTER SPACE
(1)CONFINED ENVIRONMENTS
(1)ELECTROMAGNETIC ENVIRONMENTS
(1)INDUCED ENVIRONMENTS
(1)LUNAR ENVIRONMENTS
(1)OCEAN ENVIRONMENTS
(2)BATHYAL ZONES
(2)BENTHONIC ZONES
(3)ABYSSAL ZONES
(3)LITTORAL ZONES
(2)EUPHOTIC ZONES

ENZYME PRECURSORS
(1)ENZYMES
(2)ADENYL CYCLASE
(2)COENZYMES
(3)CYTOCHROME OXIDASE
(3)GLUTATHIONE
(2)COLLAGENASE
(2)DEHYDROGENASES
(3)LACTIC DEHYDROGENASE
(3)PHOSPHATE DEHYDROGENASE
(2)DEXTRANSUCRASE
(2)GLUCANASES
(2)HYDROLASES
(3)AMIDE HYDROLASES
(4)GLUTAMINASE
(4)PENICILLINASE
(4)UREASE
(3)ESTERASES
(4)CARBOXYLIC ESTER HYDROLASES
(5)CHOLINESTERASE
(6)ACETYLCHOLINESTERASE
(4)PHOSPHORIC MONOESTER HYDROLASES
(5)PHOSPHATASES
(6)ACID PHOSPHATASE
(3)GLYCOSIDE HYDROLASES
(4)CELLULASE
(4)GLYCOSIDASES
(4)NEURAMIDASE
(3)PENICILLIN ACYLASE
(3)PEPTIDE HYDROLASES
(4)CHYMOTRYPSIN
(4)CLOSTRIDIOPEPTIDASE A
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  OPTICAL EQUIPMENT
  OPTICAL EQUIPMENT COMPONENTS
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  PANORAMIC EQUIPMENT
  PHOTOGRAPHIC EQUIPMENT
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  PNEUMATIC EQUIPMENT
  PORTABLE EQUIPMENT
  POWER EQUIPMENT
  PRINTING EQUIPMENT
  PROCESSING EQUIPMENT
  PROTECTIVE EQUIPMENT
  RADAR EQUIPMENT
  RADIO EQUIPMENT
  RENTAL EQUIPMENT
  RESCUE EQUIPMENT
  RESERVE EQUIPMENT
  REUSABLE EQUIPMENT
  ROAD BUILDING EQUIPMENT
  RUGGEDIZED EQUIPMENT
  RUSSIAN EQUIPMENT
  SAFETY EQUIPMENT
  SEA RESCUE EQUIPMENT
  SEMIPORTABLE EQUIPMENT
  SHIP AUXILIARY EQUIPMENT
  SONAR EQUIPMENT
  STANDBY EQUIPMENT
  SUBMARINE EQUIPMENT
  SUBMINIATURE ELECTRICAL EQUIPMENT

[redacted]

ETDE/PUB-2

(DE90008750)

INTERNATIONAL ENERGY

Subject Thesaurus

1990

IEA [redacted] ENERGY TECHNOLOGY DATA EXCHANGE

10

Descriptor → DISTRICT HEATING [01] ← Indicates valid INIS descriptor

DA January 1975 ← Date entered into thesaurus

Broader Term → BT1 Heating

Narrower Term → NT1 Geothermal District Heating

Related Term →
- *RT* Central Heating Plants
- *RT* Co-Generation
- *RT* DEUS
- *RT* Dual-Purpose Power Plants
- *RT* Geothermal Heating Systems
- *RT* Heat Distribution Systems
- *RT* Hot Water
- *RT* Thermal Transmission ICES

DISTRICT HEATING [01]
(For energy distribution use ENERGY SPECTRA.) ← Scope Note

USED FOR indicating multiple USE references →
- UF+ ***Inclusive Distribution***
- NT1 Angular Distribution
- NT1 Spatial Distribution
- NT1 Tissue Distribution
- *RT* Allocations
- *RT* Asymmetry
- *RT* Boltzmann Statistics
- *RT* Gauss Function
- *RT* Gaussian Processes
- *RT* Isotropy
- *RT* Particle Kinematics
- *RT* Symmetry

Forbidden Term with multiple USE references → *Inclusive Distribution* (Note italics)
- USE Distribution
- AND Inclusive Interactions

HELIOS FACILITY
- DA July 1979
- *RT* Carbon Dioxide Lasers
- *RT* Laser Fusion Reactors

Definition → DEF A 10 kJ. 8-beam. CO_2 laser facility at Los Alamos for laser fusion experiments

ACTINIDE COMPOUNDS[01]

See NT1 descriptor for narrower terms →
- *NT1 Actinium Compounds
- *NT1 Americium Compounds
- *NT1 Berkelium Compounds
- *NT1 Californium Compounds
- *NT1 Curium Compounds
- *NT1 Einsteinium Compounds
- *NT1 Fermium Compounds
- *NT1 Lawrencium Compounds
- *NT1 Mendelevium Compounds
- *NT1 Neptunium Compounds
- *NT1 Nobelium Compounds
- *NT1 Plutonium Compounds
- *NT1 Protactinium Compounds
- *NT1 Thorium Compounds
- *NT1 Uranium Compounds

Subject Thesaurus

A-1 Reactor (Bohunice)
DA December 1, 1974
USE Bohunice A-1 Reactor

A-1 Reactor (Calder Hall)
DA December 1, 1974
USE Calder Hall A-1 Reactor

A-2 Reactor (Bohunice)
DA December 1, 1974
USE Bohunice A-2 Reactor

A-2 Reactor (Calder Hall)
DA December 1, 1974
USE Calder Hall A-2 Reactor

→**A0-980 MESONS [01]**
(Prior to January 1988 this concept was indexed by Delta-966 Resonances.)
DA January 25, 1988
UF *Delta-966 Resonances*
BT1 Scalar Mesons
BT2 Mesons
BT3 Bosons
BT3 Hadrons
BT4 Elementary Particles

A1-1070 Resonances
(Prior to January 1988 this was a valid descriptor.)
DA December 1, 1974
USE A1-1270 Mesons

→**A1-1270 MESONS [01]**
(Prior to January 1988 this concept was indexed by A1-1070 RESONANCES.)
DA January 29, 1988
UF *A1-1070 Resonances*
BT1 Axial Vector Mesons
BT2 Mesons
BT3 Bosons
BT3 Hadrons
BT4 Elementary Particles

A-15 Compounds
DA May 2, 1979
USE Beta-W Lattices

A2-1310 Resonances
(Prior to January 1988 this was a valid descriptor.)
DA December 1, 1974
USE A2-1320 Mesons

→**A2-1320 MESONS [01]**
(Prior to January 1988 this concept was indexed by A2-1310 RESONANCES.)
DA January 29, 1988
UF *A2-1310 Resonances*
BT1 Tensor Mesons
BT2 Mesons
BT3 Bosons
BT3 Hadrons
BT4 Elementary Particles

A2H-1320 Resonances
(Prior to March 1988 this was a valid descriptor.)
DA December 1, 1974
USE Mesons

A2L-1280 Resonances
(Prior to March 1988 this was a valid descriptor.)
DA December 1, 1974
USE Mesons

→**A3-2050 MESONS [01]**
DA February 1, 1988
BT1 Tensor Mesons
BT2 Mesons
BT3 Bosons
BT3 Hadrons
BT4 Elementary Particles

A3 Resonances
DA December 1, 1974
USE Pi2-1680 Mesons

A4-1960 Resonances
(Prior to February 1988 this was a valid descriptor.)
DA March 26, 1975
USE A4-2040 Mesons

→**A4-2040 MESONS [01]**
(Prior to February 1988 this concept was indexed by A4-1960 RESONANCES.)
DA February 1, 1988
UF *A4-1960 Resonances*
BT1 Tensor Mesons
BT2 Mesons
BT3 Bosons
BT3 Hadrons
BT4 Elementary Particles

→**A6-2450 MESONS [01]**
DA February 1, 1988
BT1 Tensor Mesons
BT2 Mesons
BT3 Bosons
BT3 Hadrons
BT4 Elementary Particles

A 285 Steel
DA December 20, 1978
USE Steel-ASTM-A285

A-BOMB SURVIVORS [01]
DA December 1, 1974
BT1 Human Populations
BT2 Populations
RT Delayed Radiation Effects
RT Epidemiology
RT Hiroshima
RT Little Boy
RT Nagasaki

A CENTERS [01]
DA February 6, 1975
BT1 Color Centers
BT2 Vacancies
BT3 Point Defects
BT4 Crystal Defects
BT5 Crystal Structure

A CODES [01]
DA December 1, 1974
BT1 Computer Codes

A Resonances
(Prior to March 1988 this was a valid descriptor. For A3 resonances use Pi2-1680 MESONS.)
DA December 1, 1974
USE Mesons

AABO CYCLOTRON [01]
DA December 1, 1974
UF *Turku Cyclotron*
BT1 Isochronous Cyclotrons
BT2 Cyclotrons
BT3 Cyclic Accelerators
BT4 Accelerators

AAEC [01]
(Australian Atomic Energy Commission, abolished on 27 April 1987 and replaced by ANSTO.)
DA April 28, 1978
UF *Australian Atomic Energy Commission*
BT1 Australian Organizations
BT2 National Organizations
RT ANSTO

AAF
DA September 23, 1985
USE Acetylaminofluorenes

AAPS
DA May 2, 1979
UF *Advanced Automotive Propulsion Systems*
RT Automotive Industry
RT Electric-Powered Vehicles
RT Gas Turbine Engines
RT Internal Combustion Engines
RT Stirling Engines

AARR REACTOR [01]
DA December 1, 1974
UF *Argonne Tank Research and Test Reactor-AARR*
BT1 Research Reactors
BT2 Research and Test Reactors
BT3 Reactors
BT1 Tank Type Reactors
BT2 Reactors
BT1 Water Cooled Reactors
BT2 Reactors
BT1 Water Moderated Reactors
BT2 Reactors

ABANDONED SHAFTS
DA December 22, 1977
UF *Disused Mineshafts*
BT1 Mine Shafts
BT2 Shaft Excavations
RT Coal Mines
RT Mines

ABANDONED SITES [01]
DA October 23, 1978
RT Land Reclamation

ABANDONED WELLS
DA August 24, 1977
BT1 Wells
RT Natural Gas Wells
RT Oil Wells
DEF An oil or gas well abandoned because its yield has fallen below that necessary for profitable production.

Abashian-Booth-Crowe Effect
DA November 9, 1977
USE ABC Effect

ABC EFFECT [01]
DA November 10, 1977
UF *Abashian-Booth-Crowe Effect*
RT Interactions
RT Missing-Mass Spectra
RT Pions

RT Aquatic Organisms
RT Babcock and Wilcox-DuPont Process
RT CE Entrained Fuel Process
RT Combined-Cycle FW Process
RT Dow Gasification Process
RT Extraction Apparatuses
RT Impingement
RT Solvent Extraction

Entrainment Separators
DA March 8, 1977
USE Mist Extractors

ENTROPY [01]
DA December 1, 1974
BT1 Thermodynamic Properties
BT2 Physical Properties
RT Energy Quality
RT Enthalpy
RT H Theorem
RT Isentropic Processes
RT Thermodynamics

ENTRY CONTROL SYSTEMS [01]
DA July 8, 1982
UF *Access Denial Systems*
BT1 Control Systems
RT Physical Protection
RT Security
DEF Systems for controlling access to general and critical areas of a nuclear facility.

Envelope Houses
DA June 13, 1981
USE Double Envelope Buildings

ENVIRONMENT [01]
DA December 1, 1974
NT1 Biosphere
RT Accidents
RT Clean Air Act
RT Contamination
RT Controlled Atmospheres
RT Earth Atmosphere
RT Ecosystems
RT Environmental Effects
RT Environmental Exposure Pathway
RT Environmental Impact Statements
RT Environmental Impacts
RT Environmental Policy
RT Environmental Transport
RT Fallout Deposits
RT Habitat
RT Hydrosphere
RT National Environmental Policy Act
RT Nature Reserves
RT Pollution
RT Prevention of Significant Deterioration
RT Preventive Medicine
RT Radiation Protection
RT Radionuclide Migration
RT Reactor Sites
RT Regional Analysis
RT Site Selection
RT Thermal Comfort
RT Wilderness Protection Acts

Environmental Concentration
DA June 14, 1984
USE Ecological Concentration

ENVIRONMENTAL EFFECTS
(This descriptor is to be used only when the actual effects on the environment are discussed.)
DA April 8, 1975
RT Environment
RT Environmental Impact Statements
RT Environmental Impacts
RT Environmental Policy
RT Land Pollution
RT Thermal Pollution
RT Water Pollution

ENVIRONMENTAL ENGINEERING [01]
DA December 1, 1974
BT1 Engineering
RT Aesthetics
RT Air Conditioning
RT Pollution Control Equipment

ENVIRONMENTAL EXPOSURE
DA September 21, 1984
RT Air Pollution
RT Carcinogens
RT Ionizing Radiations
RT Land Pollution
RT Man
RT Mutagens
RT Water Pollution

Environmental Exposure Chambers
DA October 20, 1977
USE Exposure Chambers

ENVIRONMENTAL EXPOSURE PATHWAY [01]
DA October 1, 1975
RT Biointrusion
RT Biological Availability
RT Biological Models
RT Ecosystems
RT Environment
RT Food Chains
RT Intrusion

ENVIRONMENTAL IMPACT STATEMENTS [01]
DA January 30, 1975
BT1 Document Types
RT Environment
RT Environmental Effects
RT Environmental Impacts
RT National Environmental Policy Act

ENVIRONMENTAL IMPACTS [01]
(This descriptor is to be used to describe the possible effects on the environment from a proposed project.)
DA January 31, 1977
RT Aesthetics
RT Environment
RT Environmental Effects
RT Environmental Impact Statements
RT Environmental Policy
RT Environmental Quality
RT Nuclear Winter
RT SEEDIS

ENVIRONMENTAL MATERIALS [01]
(Use only for unspecified samples from the environment. See also specific environmental materials.)
DA January 23, 1978
UF *Materials (Environmental)*
BT1 Materials
RT Air
RT Atmospheric Precipitations
RT Biological Materials
RT Minerals
RT Monitoring
RT Ores
RT Rocks
RT Sediments
RT Soils
RT Water

ENVIRONMENTAL MEASUREMENTS LABORATORY
DA July 20, 1984
UF EML
BT1 US DOE
BT2 US Organizations
BT3 National Organizations

Environmental Parks
DA August 8, 1978
USE Nature Reserves

ENVIRONMENTAL POLICY [01]
DA February 14, 1978
SF *Policy*
NT1 Water Policy
RT Clean Air Act
RT Economics
RT Environment
RT Environmental Effects
RT Environmental Impacts
RT Environmental Quality
RT National Environmental Policy Act
RT Planning
RT Superfund

Environmental Protection Agency
DA December 1, 1974
USE US EPA

ENVIRONMENTAL QUALITY
DA September 6, 1979
NT1 Air Quality
NT1 Water Quality
RT Environmental Impacts
RT Environmental Policy
RT Quality of Life

Environmental Temperature
DA March 22, 1976
USE Ambient Temperature

ENVIRONMENTAL TRANSPORT [01]
DA November 1, 1976
SF *Heat Dissipation*
SF *Transport (Environmental)*
BT1 Mass Transfer
NT1 Long-Range Transport
NT1 Radionuclide Migration
NT1 Runoff
RT Air-Biosphere Interactions
RT Air-Water Interactions
RT Carbon Sources
RT Downwelling
RT Ecological Concentration
RT Environment
RT Leachates
RT Radioecological Concentration
RT Sinks
RT Transfrontier Contamination

ENZYMATIC HYDROLYSIS
DA March 22, 1976
BT1 Hydrolysis
BT2 Lysis
BT2 Solvolysis
BT3 Decomposition
BT4 Chemical Reactions
RT Acid Hydrolysis
RT Alkaline Hydrolysis
RT Biodegradation
RT Cellulase
RT Cellulolytic Activity
RT Clostridium Thermocellum
RT Enzymes
RT Hydrolases
RT Pellicularia
RT Thermoactinomyces
RT Thielavia

ENZYME ACTIVITY [01]
DA August 8, 1978
NT1 Cellulolytic Activity
RT Biochemical Reaction Kinetics
RT Chemical Reaction Kinetics
RT Enzymes
RT Metabolic Activation
RT Metabolism
RT Structure-Activity Relationships

ENZYME IMMUNOASSAY [01]
DA February 22, 1985
BT1 Immunoassay
BT2 Bioassay
RT Antibodies
RT Antigen-Antibody Reactions
RT Antigens
RT CPS
RT Enzymes

ENZYME INDUCTION
DA November 19, 1985
BT1 Gene Regulation
RT Biosynthesis
RT Enzymes

NASA SP-7064
(Vol. 1)

NASA THESAURUS

VOLUME 1
HIERARCHICAL LISTING
1988 EDITION

National Aeronautics
and Space Administration

Scientific and Technical
Information Division

1988

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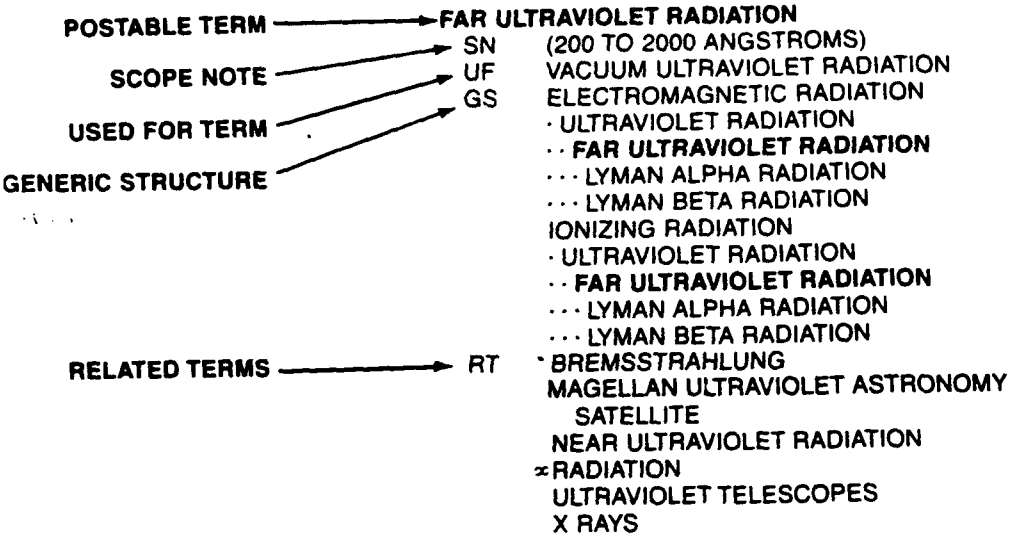

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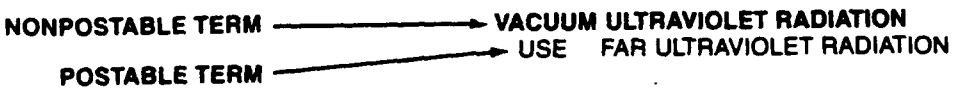

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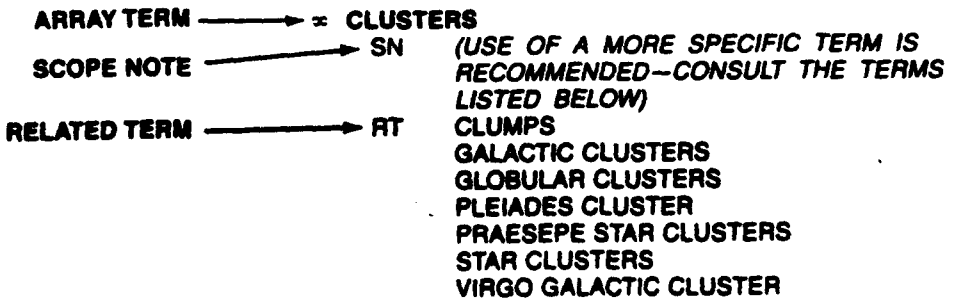

ENRICO FERMI ATOMIC POWER-*(CONT.)*
. NUCLEAR POWER PLANTS
. . ENRICO FERMI ATOMIC POWER PLANT
NUCLEAR ELECTRIC POWER GENERATION
. NUCLEAR POWER PLANTS
. . ENRICO FERMI ATOMIC POWER PLANT
RT BREEDER REACTORS
FAST NUCLEAR REACTORS
LIQUID METAL COOLED REACTORS
∞POWER PLANTS

ENSKOG-CHAPMAN THEORY
USE CHAPMAN-ENSKOG THEORY

ENSTATITE
GS CHALCOGENIDES
. OXIDES
. . PYROXENES
. . . ENSTATITE
MAGNESIUM COMPOUNDS
. ENSTATITE
MINERALS
. PYROXENES
. . ENSTATITE
SILICON COMPOUNDS
. SILICATES
. . PYROXENES
. . . ENSTATITE
RT CHONDRULE
IGNEOUS ROCKS
REGOLITH
ROCKS
SOILS

ENSTROPHY
USE VORTICITY

ENTERPRISE (ORBITER)
UF SPACE SHUTTLE ORBITER 101
GS MANNED SPACECRAFT
. SPACE SHUTTLE ORBITERS
. . ENTERPRISE (ORBITER)
REENTRY VEHICLES
. RECOVERABLE SPACECRAFT
. . REUSABLE SPACECRAFT
. . . SPACE SHUTTLE ORBITERS
. . . . ENTERPRISE (ORBITER)
RT MANNED SPACE FLIGHT
∞SPACECRAFT

ENTHALPY
UF HEAT CONTENT
GS HEAT
. ENTHALPY
. . GIBBS FREE ENERGY
. . HEAT OF DISSOCIATION
. . HEAT OF FORMATION
. . HEAT OF SOLUTION
. . LATENT HEAT
. . . HEAT OF FUSION
. . . HEAT OF VAPORIZATION
THERMODYNAMIC PROPERTIES
. ENTHALPY
. . GIBBS FREE ENERGY
. . HEAT OF DISSOCIATION
. . HEAT OF FORMATION
. . HEAT OF SOLUTION
. . LATENT HEAT
. . . HEAT OF FUSION
. . . HEAT OF VAPORIZATION
RT ADIABATIC CONDITIONS
DRYING
∞ENERGY
ENTROPY
FREE ENERGY
GIBBS-HELMHOLTZ EQUATIONS
HEAT MEASUREMENT
JOULE-THOMSON EFFECT
MOLLIER DIAGRAM
SPECIFIC HEAT
THERMOCHEMISTRY
THERMODYNAMICS

ENTHALPY-ENTROPY DIAGRAMS
USE MOLLIER DIAGRAM

ENTIRE FUNCTIONS
UF INTEGRAL FUNCTIONS
GS ANALYSIS (MATHEMATICS)
. COMPLEX VARIABLES
. . ANALYTIC FUNCTIONS
. . . ENTIRE FUNCTIONS

ENTIRE FUNCTIONS-*(CONT.)*
FUNCTIONS (MATHEMATICS)
. ANALYTIC FUNCTIONS
. . ENTIRE FUNCTIONS

ENTOMOLOGY
RT INSECTICIDES
INSECTS
∞SCIENCE
∞ZOOLOGY

ENTRAINMENT
RT AERATION
AEROSOLS
BLOWING
COANDA EFFECT
DISPERSING
SPRAYING
SUSPENDING (MIXING)

ENTRANCES
RT CURTAINS
DOORS
INTAKE SYSTEMS
∞THRESHOLDS
TRANSFER TUNNELS

ENTRAPMENT
RT ACCUMULATORS
CONFUSION
ESCAPE (ABANDONMENT)
RADIATION BELTS
TANGLING
TRAPS

ENTROPY
GS THERMODYNAMIC PROPERTIES
. ENTROPY
RT CROCCO METHOD
∞ENERGY
ENTHALPY
HEAT
MAXIMUM ENTROPY METHOD
MOLLIER DIAGRAM
NONISENTROPICITY
SHANNON-WIENER MEASURE
TEPHIGRAMS
THERMOCHEMISTRY
THERMODYNAMICS

ENTROPY (STATISTICS)
GS ENTROPY (STATISTICS)
. MAXIMUM ENTROPY METHOD
. MINIMUM ENTROPY METHOD
RT ∞STATISTICS

∞ ENTRY
SN *(USE OF A MORE SPECIFIC TERM IS RECOMMENDED--CONSULT THE TERMS LISTED BELOW)*
RT ATMOSPHERIC ENTRY
REENTRY

ENTRY GUIDANCE (STS)
GS GUIDANCE (MOTION)
. ENTRY GUIDANCE (STS)
RT ATMOSPHERIC ENTRY
FLIGHT CONTROL
HYPERSONIC REENTRY
POINTING CONTROL SYSTEMS
SPACE SHUTTLES
SPACE TRANSPORTATION SYSTEM FLIGHTS
SPACECRAFT REENTRY
TERMINAL GUIDANCE

ENUMERATION
RT COUNTING
LISTS
NUMBER THEORY

∞ ENVELOPES
SN *(USE OF A MORE SPECIFIC TERM IS RECOMMENDED--CONSULT THE TERMS LISTED BELOW)*
RT COVERINGS
ENCLOSURES
FLIGHT ENVELOPES
LIMITS (MATHEMATICS)
STELLAR ENVELOPES

ENVIRONMENT EFFECTS
SN (EFFECTS ON ENVIRONMENT)
RT AIR POLLUTION

ENVIRONMENT EFFECTS-*(CONT.)*
COASTAL ECOLOGY
COASTAL WATER
CONTAMINANTS
CONTAMINATION
DEBRIS
DEFORESTATION
∞EFFECTS
ENVIRONMENTS
EUTROPHICATION
EXHAUST GASES
GREENHOUSE EFFECT
HABITATS
ICE ENVIRONMENTS
MAN ENVIRONMENT INTERACTIONS
MARINE BIOLOGY
MARINE ENVIRONMENTS
METABOLIC WASTES
NOISE POLLUTION
POISONS
POLLUTION
SEWAGE
SOIL EROSION
THERMAL POLLUTION
WASTE DISPOSAL
WASTES
WATER POLLUTION
WATER QUALITY
WATER RESOURCES
WETLANDS
WILDLIFE

ENVIRONMENT MANAGEMENT
GS MANAGEMENT
. ENVIRONMENT MANAGEMENT
RT CONSERVATION
EARTH RESOURCES
ENVIRONMENTAL MONITORING
LAND MANAGEMENT
LAND USE
MAN ENVIRONMENT INTERACTIONS
RESOURCES MANAGEMENT
WATER MANAGEMENT
WATER RESOURCES

ENVIRONMENT MODELS
GS MODELS
. ENVIRONMENT MODELS
RT ATMOSPHERIC MODELS
EXOBIOLOGY
TEST CHAMBERS

ENVIRONMENT POLLUTION
GS POLLUTION
. ENVIRONMENT POLLUTION
. . AIR POLLUTION
. . . GLOBAL AIR POLLUTION
. . . INDOOR AIR POLLUTION
. . WATER POLLUTION
. . . OIL POLLUTION
RT AEROBIOLOGY
AEROSOLS
AIR SAMPLING
CLEAN ENERGY
EARTH RESOURCES
ENVIRONMENTAL MONITORING
ENVIRONMENTAL SURVEYS
HUMAN WASTES
METABOLIC WASTES
NOISE POLLUTION
OIL SLICKS
POISONS
POLLUTION MONITORING
POLLUTION TRANSPORT
RADIOACTIVE WASTES
THERMAL POLLUTION
WASTE DISPOSAL

ENVIRONMENT PROTECTION
GS PROTECTION
. ENVIRONMENT PROTECTION
RT AIR POLLUTION
CENTRAL ATLANTIC REGIONAL ECOL TEST SITE
EFFLUENTS
ENVIRONMENTAL MONITORING
POLLUTION
RADIOACTIVE WASTES
WASTE DISPOSAL
WATER POLLUTION

ENVIRONMENT SIMULATION
GS SIMULATION
. ENVIRONMENT SIMULATION
. . ACOUSTIC SIMULATION

NASA SP-7064
(Vol. 2)

NASA THESAURUS

VOLUME 2
ACCESS VOCABULARY
1988 EDITION

National Aeronautics
and Space Administration

Scientific and Technical
Information Division

1988

ENVIRONMENT EFFECTS

Environment Experiment, Electromagnetic
USE ELECTROMAGNETIC ENVIRONMENT EXPERIMENT

Environment Interactions, Man
USE MAN ENVIRONMENT INTERACTIONS

Environment, Lunar
USE LUNAR ENVIRONMENT

ENVIRONMENT MANAGEMENT

Environment, Mars
USE MARS ENVIRONMENT

ENVIRONMENT MODELS

ENVIRONMENT POLLUTION

ENVIRONMENT PROTECTION

ENVIRONMENT SIMULATION

Environment Simulation, Space
USE SPACE ENVIRONMENT SIMULATION

ENVIRONMENT SIMULATORS

Environment, Space
USE AEROSPACE ENVIRONMENTS

Environmental Chambers
USE TEST CHAMBERS

ENVIRONMENTAL CHEMISTRY

ENVIRONMENTAL CONTROL

ENVIRONMENTAL ENGINEERING

ENVIRONMENTAL INDEX

ENVIRONMENTAL LABORATORIES

Environmental Lubrication, Space
USE SPACECRAFT LUBRICATION

ENVIRONMENTAL MONITORING

ENVIRONMENTAL QUALITY

ENVIRONMENTAL RESEARCH SATELLITES

Environmental Sat Sys, National Operational
USE NOESS

ENVIRONMENTAL SURVEYS

Environmental Temperature
USE AMBIENT TEMPERATURE

ENVIRONMENTAL TESTS

ENVIRONMENTS

Environments, Aerospace
USE AEROSPACE ENVIRONMENTS

Environments, Arctic
USE ICE ENVIRONMENTS

Environments, Earth Orbital
USE EARTH ORBITAL ENVIRONMENTS

Environments, Extraterrestrial
USE EXTRATERRESTRIAL ENVIRONMENTS

Environments, Frictionless
USE FRICTIONLESS ENVIRONMENTS

Environments, Geo
USE EARTH ORBITAL ENVIRONMENTS

Environments, Geosynchronous Earth Orbital
USE EARTH ORBITAL ENVIRONMENTS

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USE HIGH ALTITUDE ENVIRONMENTS

Environments, High Gravity
USE HIGH GRAVITY ENVIRONMENTS

Environments, High Temperature
USE HIGH TEMPERATURE ENVIRONMENTS

Environments, Ice
USE ICE ENVIRONMENTS

Environments, LEO
USE EARTH ORBITAL ENVIRONMENTS

Environments, Low Earth Orbital
USE EARTH ORBITAL ENVIRONMENTS

Environments, Low Temperature
USE LOW TEMPERATURE ENVIRONMENTS

Environments, Marine
USE MARINE ENVIRONMENTS

Environments, Planetary
USE PLANETARY ENVIRONMENTS

Environments, Rotating
USE ROTATING ENVIRONMENTS

Environments, Spacecraft
USE SPACECRAFT ENVIRONMENTS

Environments, Thermal
USE THERMAL ENVIRONMENTS

ENZYME ACTIVITY

ENZYMES

Enzymes, Co
USE COENZYMES

ENZYMOLOGY

EOCR (Reactor)
USE EXPERIMENTAL ORGANIC COOLED REACTORS

EOGO
USE EGO

EOLE SATELLITES

EOPAP
USE EARTH & OCEAN PHYSICS APPLICATIONS PROGRAM

EOR (Rendezvous)
USE EARTH ORBITAL RENDEZVOUS

EOS
USE LANDSAT SATELLITES

(EOS), Earth Observing System
USE EARTH OBSERVING SYSTEM (EOS)

EOS-A
USE LANDSAT E

EOS-B
USE LANDSAT F

EOSINOPHILS

EPE-A
USE EXPLORER 12 SATELLITE

EPE-B
USE EXPLORER 14 SATELLITE

EPE-C
USE EXPLORER 15 SATELLITE

EPE-D
USE EXPLORER 26 SATELLITE

EPHEMERIDES

Ephemerides, Planet
USE PLANET EPHEMERIDES

EPHEMERIS TIME

EPICARDIUM

EPICYCLOIDS

EPIDEMIOLOGY

EPIDERMIS

EPILEPSY

EPINEPHRINE

EPITAXY

Epitaxy, Graphe
USE GRAPHOEPITAXY

Epitaxy, Liquid Phase
USE LIQUID PHASE EPITAXY

Epitaxy, Molecular Beam
USE MOLECULAR BEAM EPITAXY

Epitaxy, Vapor Phase
USE VAPOR PHASE EPITAXY

EPITHELIUM

EPNL
USE EFFECTIVE PERCEIVED NOISE LEVELS

Epochs
USE TIME MEASUREMENT

EPOXIDATION

Epoxides
USE EPOXY COMPOUNDS

Epoxy Composites, Boron-
USE BORON-EPOXY COMPOSITES

Epoxy Composites, Graphite-
USE GRAPHITE-EPOXY COMPOSITES

EPOXY COMPOUNDS

EPOXY MATRIX COMPOSITES

EPOXY RESINS

Epoxy Resins, Phenolic
USE PHENOLIC EPOXY RESINS

EQUALIZERS (CIRCUITS)

Equation, Bernoulli
USE BERNOULLI THEOREM

Equation, Bethe-Salpeter
USE BETHE-SALPETER EQUATION

Equation, Blasius
USE BLASIUS EQUATION

Equation, Boltzmann Transport
USE BOLTZMANN TRANSPORT EQUATION

Equation, Boltzmann-Vlasov
USE BOLTZMANN-VLASOV EQUATION

Equation, Born-Mayer
USE BORN APPROXIMATION

Equation, Brillouin-Wigner
USE BRILLOUIN-WIGNER EQUATION

Equation, Burger
USE BURGER EQUATION

Equation, Chandrasekhar
USE CHANDRASEKHAR EQUATION

Equation, Chaplygin
USE CHAPLYGIN EQUATION

Equation, Continuity
USE CONTINUITY EQUATION

Equation, Diophantine
USE DIOPHANTINE EQUATION

TYPICAL ACCESS VOCABULARY ENTRIES

Nonpostable term in natural language order. Postable term reference.

Pseudoterms (permutations) derived from nonpostable multiword term. Postable term reference follows USE.

Air Density Explorer A
USE EXPLORER 19 SATELLITE

A, Air Density Explorer
USE EXPLORER 19 SATELLITE

Density Explorer A, Air
USE EXPLORER 19 SATELLITE

Explorer A, Air Density
USE EXPLORER 19 SATELLITE

Embedded term.

Pseudoterms (permutations) derived from embedded term.

BIOGEOCHEMISTRY

Chemistry, Biogeo
USE BIOGEOCHEMISTRY

Geochemistry, Bio
USE BIOGEOCHEMISTRY

Postable multiword term.

Pseudoterms derived from multiword term.

APOLLO SOYUZ TEST PROJECT

Project, Apollo Soyuz Test
USE APOLLO SOYUZ TEST PROJECT

Soyuz Test Project, Apollo
USE APOLLO SOYUZ TEST PROJECT

Test Project, Apollo Soyuz
USE APOLLO SOYUZ TEST PROJECT

Typical OTHER WORD entry (abbreviation) with postable term reference.

Typical OTHER WORD entry (chemical symbol) with postable term reference.

MA
USE MASSACHUSETTS

Zn
USE ZINC

NASA SP-7064
(Vol. 3)

NASA THESAURUS

VOLUME 3
DEFINITIONS
1988 EDITION

National Aeronautics
and Space Administration

Scientific and Technical
Information Division

1988

INTRODUCTION

Definitions are given for most terms added to the *NASA Thesaurus* since 1976 as well as for many earlier terms. Definitions of more common or general scientific terms are given a NASA slant if one exists. Certain terms are not defined as a matter of policy: common place names, chemical elements, specific models of computers, and nontechnical terms. Other terms lack definitions because the *NASA Thesaurus* predates by a number of years the systematic effort to define terms. Nevertheless, definitions of older terms are continually being added.

The following data are provided for each definition: term in uppercase/lowercase form, definition *per se*, source, and year the term (not the definition) was added to the *NASA Thesaurus*. The NASA History Office is the authority for capitalization of NASA names. USE cross references from the *NASA Thesaurus* are also included in uppercase/lowercase form.

SOURCES OF DEFINITIONS

Definitions with no source given were constructed by lexicographers at the NASA Scientific and Technical Information (STI) Facility, who rely on the following sources for their information: experts in the field, literature searches from the NASA STI database, and specialized references, including those listed below.

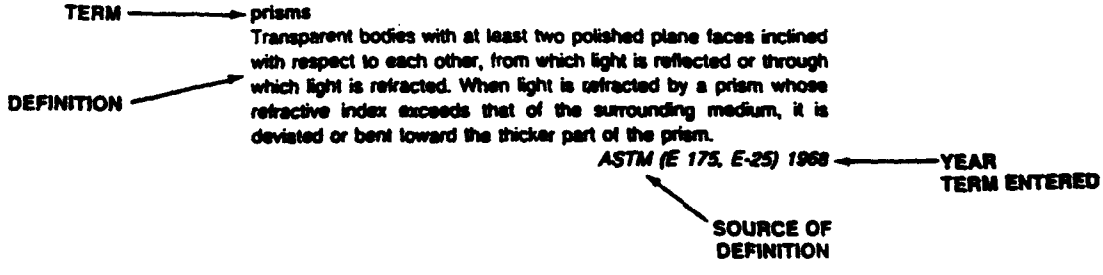
ASTM. *Compilation of ASTM Standard Definitions*, 6th edition. Philadelphia, PA, ASTM, 1986. Copyright, the American Society for Testing and Materials (ASTM). All rights reserved. Used with the permission of ASTM. Two ASTM sources are distinguished: standards are identified by an alphanumeric designation with no hyphen; committees are identified by an alphanumeric designation with a hyphen. The original definitions appeared in the *Annual Book of ASTM Standards.*

DOE. *Energy Data Base Subject Thesaurus* (DOE/TIC-7000-R7). Oak Ridge, TN, Department of Energy, 1987.

SP-7. *Dictionary of Technical Terms for Aerospace Use, NASA SP-7.* Washington, DC, NASA, 1965.

In some cases, definitions used from these sources have been subjected to editorial alterations, such as making a definition agree in number with the NASA form of the term.

TYPICAL TERM DEFINITION ENTRY



entropy
A measure of the extent to which the energy of a system is unavailable. *SP-7 1968*

entropy (statistics)
A factor or quantity that is a function of a mechanical system and is equal to the logarithm of the probability of the particular arrangement in that state. *1980*

entry guidance (STS)
The precise steering commands for trajectory from initial penetration of the earth's atmosphere until the terminal area guidance is activated at an earth-relative speed (about 2500 fps). *1980*

environmental chambers
Use test chambers

environmental chemistry
Collective term comprising the complex chemical relationships involving the atmosphere, climatology, air and water pollution, fuels, pesticides, energy, biochemistry, geochemistry, etc. *1980*

environmental temperature
Use ambient temperature

environments
External conditions or the sum of such conditions, in which pieces of equipment, living organisms, or systems operate as in temperature environment, vibration environment, or space environment. Environments are usually specified by a range of values, and may be either natural or artificial. *SP-7 1968*

eosinophils
A type of white blood cell or leukocyte which stains a red color with eosin stain; normally about 2 to 3 percent of white cells in the blood but tending to decrease during stressful situations and thus usable as an index for stress. *SP-7 1968*

ephemerides
Periodical publications tabulating the predicted positions of celestial bodies at regular intervals, such as daily, and containing other data of interest to astronomers. A publication giving similar information useful to a navigator is called an almanac. *SP-7 1968*

ephemeris time
The uniform measure of time defined by the laws of dynamics and determined in principle from the orbital motions of the planets, specifically the orbital motion of the earth as represented by Newcomb's Tables of the Sun. *SP-7 1968*

epitaxy
The oriented growth of a crystalline substance on a substrate of the same or different cystalline substance. *ASTM (F 127, F-1) 1968*

epoxy matrix composites
High strength compositions consisting of epoxy resin and a reinforcing matrix of filaments or fibers of glass, metal, or other materials. *1980*

epoxy resins
Viscous liquids or brittle solids containing epoxide groups that can be crosslinked into final form by means of a chemical reaction with a variety of setting agents used with or without heat. *ASTM (C 904, C-3) 1968*

equations of motion
A set of equations which give information regarding the motion of a body or of a point in space as a function of time when initial position and initial velocity are known. Used for motion equations. *SP-7 1968*

equations of state
Equations relating temperature, pressure, and volume of a system in thermodynamic equillibrium. Used for state equations. *SP-7 1968*

equatorial atmosphere
The composition and characteristics of the earth's atmosphere at and/or near the equator. *1978*

equatorial regions
Areas on or near the earth's equator; regions between the Tropic of Cancer and the Tropic of Capricorn (23 degrees 27 minutes North or South of the Equator). *1980*

equators
The primary great circle of a sphere or spheroid, such as the earth, perpendicular to the polar axis; or a line resembling or approximating such a circle. *SP-7 1968*

equilibrium
A state of dynamic balance between the opposing actions, reactions, or velocities of a reversible process. *ASTM (E 7, E-4) 1968*

equilibrium flow
Gas flow in which energy is constant along streamlines and the composition of the gas at any point is not time dependent. Used for steady state flow. *SP-7 1968*

equinoxes
One of two points of intersection of the ecliptic and the celestial equator occupied by the sun when its declination is zero degrees. *SP-7 1968*

ERBE
Use earth radiation budget experiment

ergometers
Instruments for measuring muscular work. *SP-7 1968*

ergonomics
Use human factors engineering

erosion
Progressive loss of original material from a solid surface due to mechanical interaction between that surface and a fluid, a multicomponent fluid, or impinging liquid or solid particles. Used for scars (geology). *ASTM (G 76, G-2) 1968*

erosive burning
Combustion of solid propellants accompanied with nonsteady, high velocity flows of product gases across burning propellant surfaces. *1980*

error band
Use accuracy

error signals
Voltages the magnitude of which are proportional to the difference between an actual and a desired position. *SP-7 1968*

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National Library of Medicine

MEDICAL SUBJECT HEADINGS—

ANNOTATED ALPHABETIC LIST

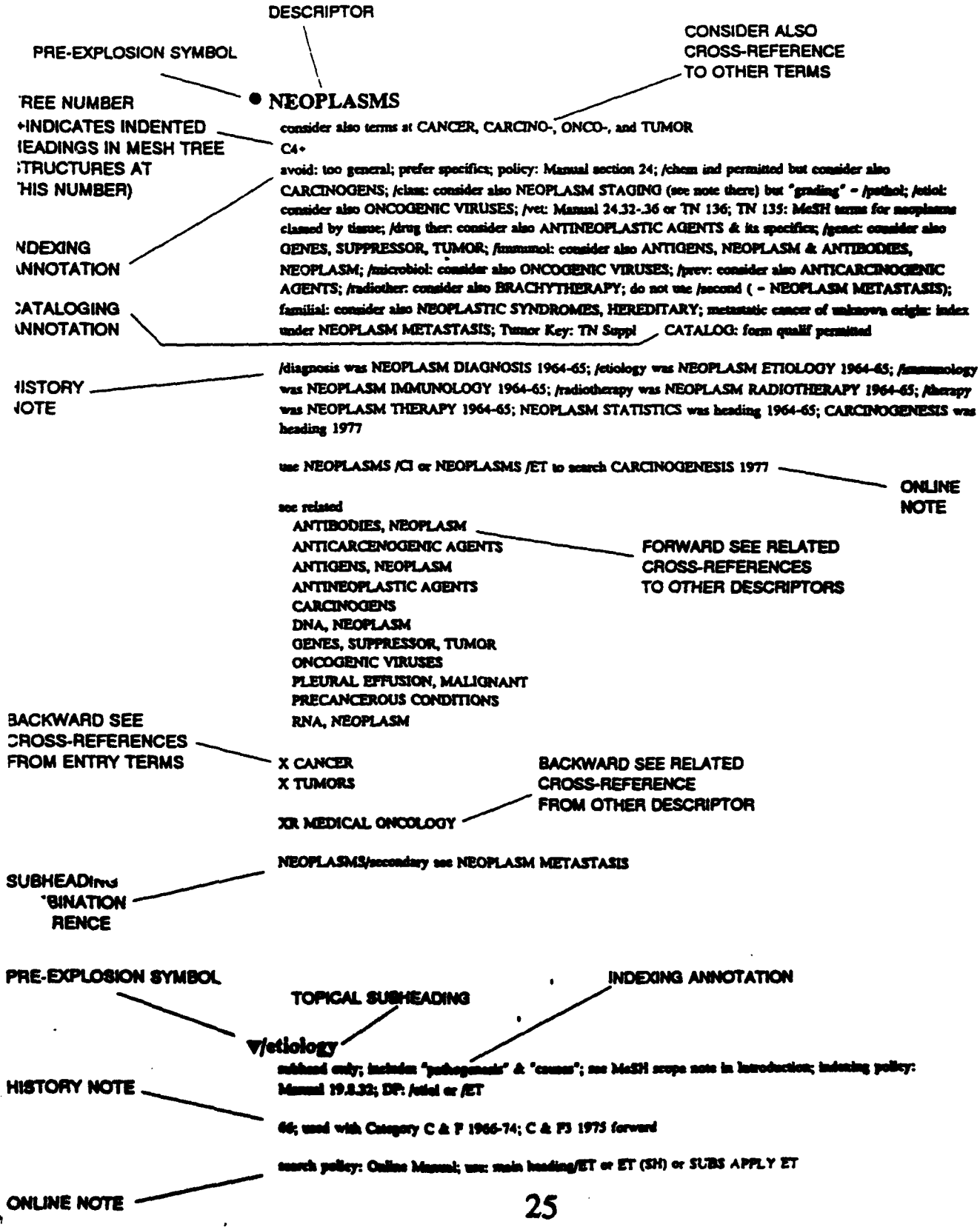
1993

U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
Public Health Service
National Institutes of Health

National Library of Medicine
Library Operations
Medical Subject Headings
Bethesda, MD 20894

SAMPLE ENTRIES

Below are sample entries for one MeSH Heading and one Topical Subheading. Further explanation may be found in the following introductory sections.



ENTEROPEPTIDASE
D8.506.277.456.732.760.284
91(73); was see under SERINE PROTEINASES 1973-90

ENTEROSORPTION
E2.912.300
a type of sorption detoxification: do not use Doriand: read MeSH definition; do not use /util except by MeSH definition
91

ENTEROSTOMY
E4.579.338+ E4.765.338+
GEN only: prefer specific intestinal -ostomy; do not use /util except by MeSH definition
88
XR INTESTINES

ENTEROTOXEMIA
C1.252.410.90.217.325 C22.313
animal only; check tag ANIMAL; coord IM with precoord animal/dis term (IM) + animal (NIM) or with animal (IM) in absence of precoord
91(69); was see under CLOSTRIDIUM INFECTIONS 1969-90

ENTEROTOXINS
D04.185.926.330
/rating permitted but consider also ANTITOXINS; coord IM with specific bacterium (IM or NIM)
68; was ENTEROTOXIN 1964-67 (Prev)
use ENTEROTOXINS to search *ENTEROTOXIN* back thru 1966 (as Prev 1966-67)
use related
STAPHYLOCOCCAL FOOD POISONING

ENTEROVIRUS INFECTIONS
C2.782.687.359+

ENTEROVIRUS 70 see ENTEROVIRUSES
B4.909.777.618.284+

ENTEROVIRUSES
B4.909.777.618.284+
a large group of the family Picornaviridae; infection = ENTEROVIRUS INFECTIONS
75; was ENTEROVIRUS 1963-74
use ENTEROVIRUSES to search ENTEROVIRUS 1966-74
X ENTEROVIRUS 70

ENTEROVIRUSES, PORCINE
B4.909.777.618.284.600
a picornavirus; infection: coord IM with ENTEROVIRUS INFECTIONS (IM); DF: use short X ref
91(75); was see under ENTEROVIRUSES 1975-90
X ECHO VIRUSES
X ENTERIC CYTOPATHIC SWINE ORPHAN VIRUS
X PORCINE ENTEROVIRUSES
X TALFAN DISEASE VIRUS
X TESCHEN DISEASE VIRUS

ENTOMOLOGY
G1.273.943.409
SPEC: SPEC qualif

ENTOMOPHTHORA
B5.354.730.944.300
a subclass of phycomycetes; infection: coord IM with MYCOSES (IM)
91(75); was see under ZYGOMYCOTINA 1986-90; was see under ZYGOMYCETES 1975-85; was see under PHYCOMYCETES 1975-78

ENTOPTIC VISION see VISION, ENTOPTIC
F2.838.816.939.600 G11.561.796.939.600
G11.697.911.720

ENTRAPMENT NEUROPATHY see NERVE COMPRESSION SYNDROMES
C10.772.491+

ENTREPRENEURSHIP
J1.210.375 N4.452.668.250
use qualif discretly
92

ENTROPION
C11.338.643

ENURESIS
C12.777.934.284 F3.126.328

ENV GENE PRODUCTS see GENE PRODUCTS, ENV
D12.776.964.775.325+ D12.776.964.970.880.325+

ENV GENES see GENES, ENV
G5.275.526.850.200 G5.275.605.800.200

ENV-ONC FUSION PROTEIN see ONCOGENE PROTEINS, FUSION
D12.776.677.500+ D12.776.964.690+

ENV POLYPROTEINS see GENE PRODUCTS, ENV
D12.776.964.775.325+ D12.776.964.970.880.325+

ENV PROTEIN see GENE PRODUCTS, ENV
D12.776.964.775.325+ D12.776.964.970.880.325+

ENV PROTEIN GP41, HIV see HIV ENVELOPE PROTEIN GP41
D12.776.964.775.325.330 D12.776.964.970.880.325.330
D12.776.964.970.880.910.330 D24.611.216.327.570.470.330

ENV PROTEIN GP120, HIV see HIV ENVELOPE PROTEIN GP120
D12.776.964.775.325.350 D12.776.964.970.880.325.350
D24.611.216.327.570.470.350

ENVELOPE GLYCOPROTEIN GP120, HIV see HIV ENVELOPE PROTEIN GP120
D12.776.964.775.325.350 D12.776.964.970.880.325.350
D24.611.216.327.570.470.350

ENVELOPE PROTEIN GP41, HIV see HIV ENVELOPE PROTEIN GP41
D12.776.964.775.325.330 D12.776.964.970.880.325.330
D12.776.964.970.880.910.330 D24.611.216.327.570.470.330

ENVELOPE PROTEINS, VIRAL see VIRAL ENVELOPE PROTEINS
D12.776.964.970.880+

ENVIOMYCIN
D20.85.89.910.345 D20.338.135.922.345
an aminoture antibiotic
91(81); was see under VIOMYCINS 1981-90; was TUBERACTINOMYCIN-N see under ANTIBIOTICS, ANTITUBERCULAR 1975-80
use ENVIOMYCIN to search TUBERACTINOMYCIN-N back thru 1975
X TUBERACTINOMYCIN N

ENVIRONMENT
G3.230+
no qualif CATALOG: /geog /form
use related
SOCIAL ENVIRONMENT
ENVIRONMENT/microbiology see ENVIRONMENTAL MICROBIOLOGY

ENVIRONMENT AND PUBLIC HEALTH (NON MESH)
G3+

ENVIRONMENT, CONTROLLED
G3.230.150+
no qualif
73
use related
ATMOSPHERIC EXPOSURE CHAMBERS
INCUBATORS
X LAMINAR AIR-FLOW AREAS

ENVIRONMENT DESIGN
G3.230.280 I1.283
I1.888.780.350
74(72)

ENVIRONMENTAL AIR POLLUTANTS see AIR POLLUTANTS, ENVIRONMENTAL
D6.284.981.143+

ENVIRONMENTAL EXPOSURE
G3.850.460.300+
may or may not result in a disease; coord IM with specific substance (IM)
74(87)
use related
AIR POLLUTANTS, ENVIRONMENTAL
ENVIRONMENTAL MONITORING
OCCUPATIONAL EXPOSURE

+ INDICATES THERE ARE INDENTED DESCRIPTORS IN MESH TREE STRUCTURES AT THIS NUMBER

ISSN: 1045-2338

National Library of Medicine

PERMUTED MEDICAL SUBJECT HEADINGS

1993

U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
Public Health Service
National Institutes of Health

National Library of Medicine
Library Operations
Medical Subject Headings
Bethesda, MD 20894

July 1993

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13. ABSTRACT *(Maximum 200 words)*

Permuted Medical Subject Headings, 1993 is a computer-generated display of all terms; i.e., descriptors and cross-references, in the alphabetic list of the National Library of Medicine's Medical Subject Headings (MeSH) for 1993, as well as all check tag and geographic descriptors in the Annotated Alphabetic MeSH, 1993. The Permuted MeSH takes each significant word that appears in each MeSH term and then lists all the MeSH terms (both descriptors and cross-references) in which that word appears. The Permuted MeSH also takes selected word roots and lists all the MeSH terms in which that root appears.

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National Library of Medicine

MEDICAL SUBJECT HEADINGS—

TREE STRUCTURES

1993

U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
Public Health Service
National Institutes of Health

National Library of Medicine
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Medical Subject Headings
Bethesda, MD 20894

ENVIRONMENT AND PUBLIC HEALTH (NON MESH)

ENVIRONMENT AND PUBLIC HEALTH (NON MESH)	G3		
ENVIRONMENT	G3.230		
ALTITUDE	G3.230.58		
CONSERVATION OF NATURAL RESOURCES	G3.230.80		
CONSERVATION OF ENERGY RESOURCES	G3.230.80.78		
DISASTERS	G3.230.100		
DISASTER PLANNING	G3.230.100.35		
EXPLOSIONS	G3.230.100.90		
FIRES	G3.230.100.120		
FIRE EXTINGUISHING SYSTEMS	G3.230.100.120.110		
NATURAL DISASTERS	G3.230.100.200		
RELIEF WORK	G3.230.100.300	I1.880.767.	
ENERGY-GENERATING RESOURCES	G3.230.132		
ELECTRICITY	G3.230.132.200	H1.671.252	
FOSSIL FUELS	G3.230.132.258	J1.435	
COAL	G3.230.132.258.108	J1.435.229	
COKE	G3.230.132.258.108.110	J1.435.229.	
PETROLEUM	G3.230.132.258.630	J1.435.723 J1.740.400.	J1.637.680
FUEL OILS	G3.230.132.258.630.500	J1.435.723.	J1.740.400.
GASOLINE	G3.230.132.258.630.540	J1.435.723.	J1.740.400.
KEROSINE	G3.230.132.258.630.600	J1.435.723.	J1.740.400.
NUCLEAR ENERGY	G3.230.132.580	H1.671.579.	
NUCLEAR FISSION	G3.230.132.580.500	H1.671.579.	
NUCLEAR FUSION	G3.230.132.580.520	H1.671.579.	
SOLAR ENERGY	G3.230.132.708		
ENVIRONMENT, CONTROLLED	G3.230.150		
AIR CONDITIONING	G3.230.150.50		
DIVING	G3.230.150.150	I3.450.642.	
HEATING	G3.230.150.300		
HOUSING	G3.230.150.360	G3.890.505.	N1.224.791.
HOUSING FOR THE ELDERLY	G3.230.150.360.125	N1.224.791.	
HOUSING, ANIMAL	G3.230.150.360.250		
HOSPITALS, ANIMAL	G3.230.150.360.250.200		
PUBLIC HOUSING	G3.230.150.360.650	N1.224.791.	
HUMIDITY	G3.230.150.372	G3.230.300.	
LIFE SUPPORT SYSTEMS	G3.230.150.391		
LIGHTING	G3.230.150.410		
SEALED CABIN ECOLOGY	G3.230.150.430		
TEMPERATURE	G3.230.150.450	G3.230.300.	H1.671.968
VENTILATION	G3.230.150.520		
ENVIRONMENT DESIGN	G3.230.200	I1.283	I1.880.709.
EXTRATERRESTRIAL ENVIRONMENT	G3.230.230		
METEOROLOGICAL FACTORS	G3.230.300		
ATMOSPHERE	G3.230.300.100		
AIR	G3.230.300.100.150		
AIR IONIZATION	G3.230.300.100.150.100	H1.181.520.	
AIR MOVEMENTS	G3.230.300.100.150.185		
WIND	G3.230.300.100.150.185.200	G3.230.300.	
ATMOSPHERIC PRESSURE	G3.230.300.100.185		
AIR PRESSURE	G3.230.300.100.185.100		
VACUUM	G3.230.300.100.185.902	H1.671.491.	
CLIMATE	G3.230.300.100.250		
COLD CLIMATE	G3.230.300.100.250.275		
DESERT CLIMATE	G3.230.300.100.250.325		
MICROCLIMATE	G3.230.300.100.250.450		
TROPICAL CLIMATE	G3.230.300.100.250.600		
COSMIC RADIATION	G3.230.300.100.300	H1.671.708.	
WEATHER	G3.230.300.100.725		
HUMIDITY	G3.230.300.100.725.310	G3.230.150.	
LIGHTNING	G3.230.300.100.725.375		
RAIN	G3.230.300.100.725.490		

PARTS OF THESAURI AND THEIR TITLES

Thesaurus	[Primary Alphabetic Sequence]	[Dictionary]	[Concordance of all Words]	[Classified Display]
DOE 1 vol.	Subject Thesaurus	Some definitions within alphabetic sequence (DEF)	N/A	N/A
DTIC 3 parts in 1 vol.	Posting Terms (Section 1)	Some definitions within primary alphabetic sequence (no tag)	Key Words Out of Context (section 3)	Hierarchy (section 2)
MeSH 3 vols. (NTIS)	Annotated Alphabetic List	Some definitions within scope notes (no tag)	Permuted Medical Subject Headings	Tree Structures
NASA	Hierarchical Listing (vol. 1)	Definitions (vol. 3)	Access Vocabulary (vol. 2)	N/A

THESAURUS NOTATION FOR SEMANTIC RELATIONSHIPS

Thesaurus	Equivalence		Hierarchy		Association	
	Code	Reciprocal	Code	Reciprocal	Code	Reciprocal
DOE	USE	UF	BT [1,2]	NT [1,2]	RT	RT
	USE AND	UF +	NT [1,2]	BT 1,2]		
DTIC	use	UF	BT	NT	[none]	
	use and	UFC	* (= broader terms exist)	[none]		
MeSH	see	x	Tree Structures		see related	XR
NASA	USE	UF	Generic Structure		RT	RT

DIALOG DATABASES WITH ONLINE THESAURI (PARTIAL LISTING)

??THESAURI

THE FOLLOWING ARE DIALOG FILES THAT CONTAIN AN ONLINE THESAURUS:

1	ERIC
11	PSYCINFO
37	SOCIOLOGICAL ABSTRACTS
72,172,173	EMBASE
154,155	MEDLINE

DIALOG: ERIC

?s environment

S1 40800

?s environment/de

S2 27317

?s environment/df

S3 3250

DIALOG BASIC INDEX/DICTIONARY FILE: ERIC

?expand environment

Ref	Items	RT	Index-terms
E1	1		ENVIRONMENT
E2	1		ENVIRONMENTAL
E3	40800	33	ENVIRONMENT (SURROUNDING CONDITIONS, FORCES, OR FACTORS P. . .)
E4	1		ENVIRONMENT AND INTEREST INVENTORY
E5	0	1	ENVIRONMENT BEHAVIOR RESEARCH
E6	18661		ENVIRONMENTAL

DIALOG ONLINE THESAURUS DISPLAY: ERIC

?expand e3

Ref	Items	Type	RT	Index-term
R1	40800		33	* ENVIRONMENT (SURROUNDING CONDITIONS, FORCES OR FACTORS P . . .)
R2	2347	N	25	CULTURAL CONTEXT
R3	337	N	12	DISADVANTAGED ENVIRONMENT
•				
•				
•				
R19	4422	R	33	ADJUSTMENT (TO ENVIRONMENT)
R20	55	R	12	APPROPRIATE TECHNOLOGY

DIALOG ONLINE THESAURUS DISPLAY: ERIC

?expand (indexing)

Ref	Items	Type	RT	Index-term
R1	1795		17	INDEXING (ASSIGNMENT OF INDEX TERMS TO DOCUMENTS OR OB . . .)
R2	13	U	1	SUBJECT ACCESS
R3	225	N	8	AUTOMATIC INDEXING
R4	3438	B	14	DOCUMENTATION
R5	510	R	8	ABSTRACTING
R7	2250	R	12	CATALOGING
R8	148	R	5	CITATION INDEXES
R9	9520	R	26	CLASSIFICATION
R10	66	R	6	COORDINATE INDEXES

PRINTED THESAURUS

INDEXING *Jul. 1966*

CIJE: 354 RIE: 458

SN Assignment of index terms to documents of objects in order to later retrieve or locate these documents or objects according to the selected concepts designated by the index terms (note: do not use for "cost indexes)

DIALOG THESAURUS CODES

?expand (educational environment)

	Ref	Items	Type	RT		Index-term
	R1	4757		28	*	EDUCATIONAL ENVIRONMENT (CONDITIONS, FORCES OR FACTORS WITHING OR EXU . . .)
→	R2	0	U	1		ACADEMIC ENVIRONMENT
	R3	1	U	1		SCHOOL CLIMATE
	R4	0	U	1		SCHOOL CONDITIONS (1966 1980)
	R5	4149	N	16		CLASSROOM ENVIRONMENT
	R6	40800	B	33		ENVIRONMENT

?expand (academic environment)

	Ref	Items	Type	RT		Index-term
→	R1	0		1	*	ACADEMIC ENVIRONMENT
	R2	4757	U	28		EDUCATIONAL ENVIRONMENT

DIALOG THESAURUS CODES: PSYCINFO

?expand (attitudes)

	Ref	Items	Type	RT	Index-term
	R1	59218		49	ATTITUDES
	R2	531	R	6	AGES (ATTITUDES TOWARD)
	R3	57	R	6	AGING (ATTITUDES TOWARD)
	R4	409	R	3	ALCOHOL DRINKING ATTITUDES
⇨	R10	0	F	1	BELIEFS (NONRELIGIOUS)
	R11	569	R	6	CLIENT ATTITUDES

MESH ON DIALOG

File 153:MEDLINE 75-82

?expand (migraine)

Ref	Items	Type	RT		Index-term
R1	1834		5	*	MIGRAINE
R2	6267	X			DC=C10.228.140.300.937.5 (MIGRAINE)
R5	162	X	1		HEMICRANIA
R6	1144	B	7		VASCULAR HEADACHE

BROADER TERM/NARROWER TERM SEQUENCE

ERIC:

?expand (indexing)

Ref	Items	Type	RT		Index-terms
R1	1795		17	*	INDEXING
R2	13	U	1		SUBJECT ACCESS
R3	225	N	8		AUTOMATIC INDEXING
R4	3438	B	14		DOCUMENTATION
R5	510	R	8		ABSTRACTING

The Computer Database

?expand (text editors)

Ref	Items	Type	RT		Index-Terms
R1	939		10	*	TEXT EDITORS
R2	1642	B	7		EDITORS
R3	5310	B	5		WORD PROCESSING
R4	24	N	2		GLOBAL SEARCHING
R5	23	N	1		GRAMMAR CRITIQUING
•					•
•					•
•					•
R9	1084	R	10		DOCUMENT PREPARATION
R10	721	R	12		PUBLISHING INDUSTRY

RECOMMENDED THESAURUS DISPLAY

?expand (indexing)

Ref	Items	‡RT	Type	Index-term
R1	1795	17		* INDEXING
R2	13	1	U	SUBJECT ACCESS
R3	3438	14	B	DOCUMENTATION+
R4	225	8	N	AUTOMATIC INDEXING+
R5	510	8	R	ABSTRACTING+
R6	88	14	R	BIBLIOMETRICS+
R7	2250	12	R	CATALOGING+
R8	148	5	R	CITATION INDEXES+

‡ CONSIDER DELETION

(rev. 5/31/88)

DIALOG: TREE STRUCTURES

?expand dc = C23.888.592.612

Ref	Items	Index-term
E1	248	DC = C23.888.592.888.638
E2	697	DC = C23.888.592.888.652
E3	0	* DC = C23.888.592.612
E4	9136	DC = C23.888.592.612 (PAIN)
E5	1740	DC = C23.888.592.612.107 (BACKACHE)
•		•
•		•
•		•
E11	1612	DC = C23.888.592.612.429 (HEADACHE)
E12	303	DC = C23.888.592.612.429.814 (VASCULAR HEADACHE)

DIALOG: ERIC ONLINE ROTATED DISPLAY

?expand zz = environment

Ref	Items		Index-terms
•	•		•
•	•		•
•	•		•
E3	40264	*	ZZ=ENVIRONMENT
E4	238		ZZ=ENVIRONMENT / / ACOUSTICAL
E5	1		ZZ=ENVIRONMENT / / BEHAVIORAL SCIENCE RESEARCH
E6	4079		ZZ=ENVIRONMENT / / CLASSROOM
E7	1477		ZZ=ENVIRONMENT / / COLLEGE
E8	262		ZZ=ENVIRONMENT / / CONTROLLED
E9	336		ZZ=ENVIRONMENT / / DISADVANTAGED
•	•		•
•	•		•
•	•		•
E15	428		ZZ=ENVIRONMENT / / RURAL
E16	293		ZZ=ENVIRONMENT / / SIMULATED
•	•		•
•	•		•
•	•		•
E24	1891		ZZ=ENVIRONMENT / / WORK

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The theme of this NASA Scientific and Technical Information Program Coordinating Council meeting was the role of controlled vocabularies (thesauri) in information retrieval. Included are summaries of the presentations and the accompanying visuals. Dr. Raya Fidel spoke on Retrieval: Free Text, Full Text, and Controlled Vocabularies. Dr. Bella Hass Weinberg spoke on Controlled Vocabularies and Thesaurus Standards. The presentations were followed by a panel discussion with participation from NASA, NLM, DTIC, and DOE; this discussion, however, is not summarized in any detail here.

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